Section 5
Member Agency Supplies

5.1 Introduction

Local resources developed and managed by the Water Authority's member agencies are critical to securing a diverse and reliable supply for the region. Local projects, such as recycled water and groundwater recovery, reduce demands for imported water and often provide agencies with a drought-proof supply. This section provides general information on the local resources being developed and managed by the member agencies. These supplies include surface water, groundwater, recycled water, and desalinated seawater.

The Water Authority, working closely with its member agencies, took the following steps to update the yields anticipated from the member agencies' local supplies:

1. Provided the member agencies with the projected supply numbers included in the Water Authority's Updated 2005 Plan and requested they update the figures for their specific project(s).
2. Prepared revised projections based on input from agencies.
3. Separated the recycled water, groundwater, and seawater desalination projects into three categories: "verifiable," "additional planned," and "conceptual" projects based on the stages of development, as defined in the introduction of Section 4, "San Diego County Water Authority Supplies."
4. Presented revised supply numbers to member agencies at several meetings and requested input.
5. Distributed the administrative draft of the 2010 Plan to member agencies for their review, providing them another opportunity to review and revise the updated local supply figures prior to Water Authority Board approval.

Before 1947, the San Diego region relied on local surface water runoff in normal and wet weather years and on groundwater pumped from local aquifers during dry years when stream flows were reduced. As the economy and population grew, local resources became insufficient to meet the region's water supply needs. From the 1950s onward, the region became increasingly reliant on imported water supplies. Since 1980, a range of 5 to 36 percent of the water used within the Water Authority's service area has come from local sources, primarily from surface water reservoirs with yields that vary directly with annual rainfall. A small but growing share of local supply comes from recycled water and groundwater recovery projects, with additional local supply planned from seawater desalination. Yield from these projects are considered drought-proof since they are primarily independent of precipitation. In fiscal year 2010, total local water sources provided 11 percent of the water used in the Water Authority's service area.

5.2 Surface Water

5.2.1 Description

The regional surface water yield is supported by 25 surface reservoirs with a combined capacity of 593,490 AF. The reservoirs are located in seven of the San Diego County's nine coastal watersheds. Table 5-1 lists the 25 reservoirs in the San Diego region. The runoff in these watersheds starts at the crest of the Peninsular Range and drains into the Pacific Ocean and is mostly developed. The oldest functional reservoir in the county, Cuyamaca Reservoir, was completed in 1887.

Olivenhain Reservoir completed in 2003 is the region's newest. It is part of the Water Authority's ESP and has a storage capacity of 24,364 AF. The ESP storage capacity will add 90,100 AF and is designed to protect the region from disruptions in the water delivery system. In addition, the 2002 Regional Water Facilities Master Plan (Master Plan) identified an opportunity to augment the ESP with a carryover storage component at San Vicente. The Carryover Storage Project (CSP) is scheduled for completion in late 2012, with filling scheduled to occur within three to five years, and will provide 100,000 AF of water storage resources to buffer dry-year supply shortages. Refer to Section 11.2.3, "Water Authority Dry-Year Supplies," for additional information on carryover storage.

Table 5-1. Major San Diego County Reservoirs

Member Agency	Reservoir	Capacity (AF)
Carlsbad MWD	Maerkle	600
Escondido, city of	Dixon	2,606
Escondido, city of	Wohlford	6,506
Fallbrook PUD	Red Mountain	1,335
Helix WD	Cuyamaca	8,195
Helix WD	Jennings	9,790
Poway, city of	Poway	3,330
Rainbow MWD	Beck	625
Rainbow MWD	Morro Hill[1]	465
Ramona MWD	Ramona	12,000
San Diego, city of	Barrett	37,947
San Diego, city of	El Capitan[2]	112,807
San Diego, city of	Hodges[3]	30,251
San Diego, city of	Lower Otay	49,510
San Diego, city of	Miramar	7,185
San Diego, city of	Morena	50,207
San Diego, city of	Murray	4,818
San Diego, city of	San Vicente	90,230

Member Agency	Reservoir	Capacity (AF)
San Diego, city of	Sutherland	29,685
San Dieguito WD/Santa Fe ID	San Dieguito	883
SDCWA/Olivenhain MWD	Olivenhain	24,364
Sweetwater Authority	Loveland	25,387
Sweetwater Authority	Sweetwater	28,079
Valley Center MWD	Turner[4]	1,612
Vista ID	Henshaw	51,774
Total Capacity		590,191

= Connected to Water Authority aqueduct system.

[1] Not currently in service due to maintenance; to return online in 2012.

[2]Imported water can be delivered via San Vicente.

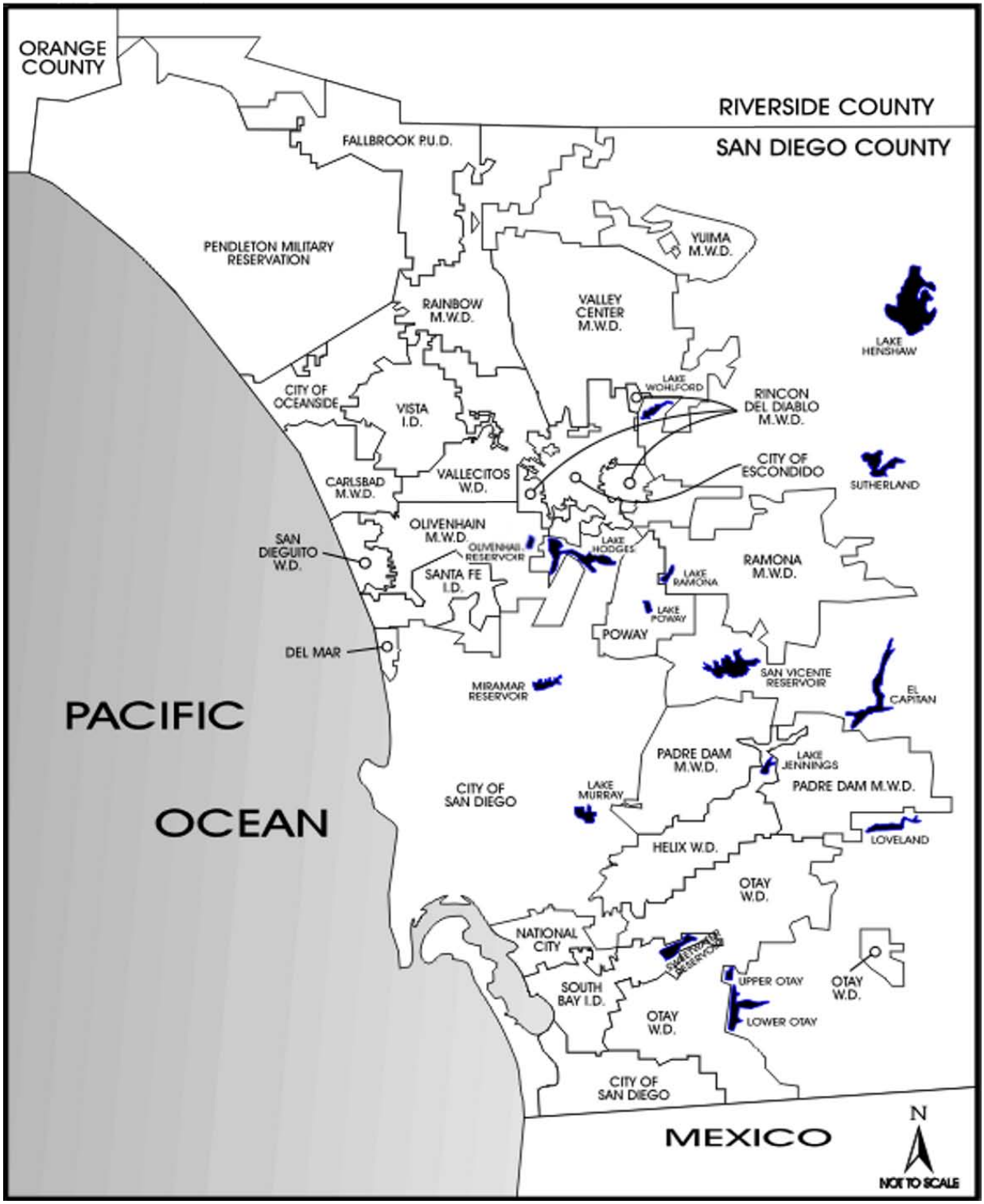
[3] System connection is projected to be in service beginning 2011 as part of the ESP.

[4] Not currently in service as a supply reservoir.

Definitions:

ID = Irrigation District; MWD = Metropolitan Water District; PUD = Public Utility District; WD = Water District

Figure 5-1
Major San Diego County Reservoirs



5.2.2 Issues

5.2.2.1 Management

The Water Authority's member agencies manage most of the region's reservoirs. The Water Authority manages the imported conveyance system to achieve the optimal use of both local and imported water resources, which includes the local reservoirs. In order to reduce the need for imported water purchases, the reservoirs are operated to maximize the use of this local supply. Local surface water supplies can also offset dry-year shortfalls in imported water. Maximizing local yield reduces losses due to evaporation and spills, but it also results in increased demands for imported water during dry years when imported water is more likely to be in short supply. Most member agencies maintain some portion of their storage capacity for emergency storage. The 2002 Master Plan identified carryover storage as necessary to supplement supplies during dry weather events and to maximize the efficient use of existing and planned infrastructure. Currently the Water Authority is operating carryover storage accounts in member agency reservoirs to attenuate the effects of any supply shortfall.

5.2.2.2 Water Quality

See Section 7, "Water Quality," for information.

5.2.3 Encouraging Optimization of Local Surface Water Reservoirs

To optimize the use of local storage, the Water Authority works with its member agencies through storage agreements and through the aqueduct operating plan. The storage agreements allow for carryover storage in member agency reservoirs and provide increased local storage, which can be used during peaks on the aqueduct system. The aqueduct operating plans coordinate imported water deliveries and optimize reservoir fill opportunities. Local yield is maximized by the member agencies that operate the reservoirs. Through the Water Authority's 2012 Regional Water Facilities Optimization and Master Plan Update (Master Plan Update) the Water Authority, in coordination with its member agencies, will model and evaluate whether other opportunities for storage optimization exist.

5.2.4 Projected Surface Water Supplies

Surface water supplies represent the largest single local resource in the Water Authority's service area. However, annual surface water yields can vary substantially due to fluctuating hydrologic cycles. Since 1980, annual surface water yields have ranged from a low of 18,000 AF to a high of 146,000 AF. Planned ESP projects are expected to increase local yield due to the more efficient use of local reservoirs; the volume has not been determined. Water Authority member agency determined average surface water yield to range from 48,206 AF per year in 2015 to 47,289 AF per year in 2035.

A list of the individual reservoirs, expected yield, and basis for the supply figure can be found in **Appendix F**, Table F-1. Table 5-2 shows the projected average surface water supply within the Water Authority's service area, and the yields are utilized in the reliability analysis included in Section 9, "Water Supply Reliability."

Specific information on the projected yields from local reservoirs is expected to be included in the member agencies' 2010 plans.

Table 5-2. Projected Surface Water Supply (Normal Year – AF/YR)

2010	2015	2020	2025	2030	2035
27,336 [1]	48,206[2]	47,940	47,878	47,542	47,289

[1] Based on fiscal year 2010 totals.

[2] Post-2015 supply adjusted downward to account for increase in Cal Am demands from City of San Diego.

5.3 Groundwater

One of the elements identified in the Water Authority's resource mix is the use and optimization of groundwater supplies by member agencies. It should be noted that the Water Authority does not currently hold groundwater basin rights, nor does it own or operate groundwater facilities within San Diego county. Although opportunities are limited, groundwater is currently being used to meet a portion of the municipal water demands throughout the Water Authority's service area from MCB Camp Pendleton in the north to National City in the south. This section provides a general description of: municipal groundwater development within the Water Authority's service area, the issues associated with development of this supply, and projected agency yields. Specific information required under the Act on groundwater basins and projects is expected to be included in the member agencies' 2010 plans.

5.3.1 Description

Within the past five years, water supply agencies within the Water Authority's service area have produced an annual average of approximately 18,300 AF of potable water supplies from groundwater. This total represents production from both brackish groundwater desalination facilities and municipal wells producing groundwater not requiring desalination. It does not include production from privately owned water wells used for irrigation and domestic purposes, or several thousand acre-feet of groundwater produced annually from the Warner Basin by Vista Irrigation District, but discharged to Lake Henshaw, a surface water reservoir, then released downstream of the dam.

In addition to providing a local supply to water agencies, groundwater is also a source of supply for numerous private well owners who draw on groundwater to help meet their domestic and agriculture water needs. In the Ramona area alone, over 1,000 privately owned wells provide a supplementary source of water for Ramona MWD customers. Similar domestic uses occur throughout the Water Authority's service area. These domestic supplies help to offset demand for imported water provided by the Water Authority and its member agencies. Although the amount of groundwater pumped by private wells is significant, it cannot be accurately quantified nor estimated within the Water Authority's entire service area.

Groundwater production in the Water Authority's service area is limited by a number of factors including: the limited geographic extent of the more productive sand and gravel (alluvial) aquifers; the relatively shallow nature of most of the alluvial aquifers; lack of rainfall and groundwater recharge; and degraded water quality resulting from human activities, such as septic tank use.

Shallow and narrow river valleys filled with alluvial sand and gravel deposits are characteristic of the more productive groundwater basins in the San Diego region. Outside of these more productive aquifers, groundwater is developed from fractured crystalline bedrock and semi-consolidated sedimentary deposits that occur throughout the region. However, yield and storage in these aquifers are limited, and the aquifers are best suited for meeting domestic water needs that do not require higher flow rates. Figure 5-2 shows the location of the principal alluvial groundwater basins within the Water Authority's service area.

Figure 5-2
Alluvial Groundwater Basins

Although groundwater supplies are less plentiful in the San Diego region than in some other areas of California, such as the Los Angeles Basin in southern California and the Central Valley in northern California, the Water Authority believes that sufficient undeveloped brackish groundwater supplies exist that could help meet a greater portion of the region's future water demand. Several agencies within the Water Authority's service area have identified potential projects that may provide several thousand to tens of thousands acre-feet of additional groundwater production in the coming years. A general summary and description of these projects is presented below.

5.3.1.1 Groundwater Extraction and Disinfection Projects

Groundwater that can be extracted and used as a potable water supply, with little more than disinfection, generally occurs outside the influence of human activities and within the upper reaches of the east–west trending watersheds. Wells producing higher quality water are operated by MCB Camp Pendleton (Santa Margarita River watershed) and the Sweetwater Water Authority (San Diego Formation aquifer). The Vista Irrigation District also operates numerous high quality extraction wells in the Warner Basin, located in the upper San Luis Rey River watershed. The water from these wells is discharged to Lake Henshaw and eventually to the San Luis Rey River where it is then diverted further downstream for use in the city of Escondido and elsewhere. The unit cost of water produced from simple groundwater extraction and disinfection projects is low and generally well below the cost of imported water. Because most of the higher quality groundwater within the Water Authority's service area is already being fully utilized, the focus for future local groundwater development is brackish groundwater recovery and treatment.

5.3.1.2 Brackish Groundwater Recovery Projects

Groundwater that is high in salts and total dissolved solids (TDS) and other contaminates, and requires advanced treatment prior to potable use, is typically found in shallow basins in the downstream portions of watersheds. Brackish groundwater recovery projects use membrane technology, principally reverse osmosis, to treat extracted groundwater to potable water standards. The city of Oceanside's 6.37-MGD capacity Mission Basin Desalter and the Sweetwater Authority's existing 4.0-MGD Richard A. Reynolds Groundwater Desalination Facility are the only currently operating brackish groundwater recovery and treatment facilities within the Water Authority's service area. Unit costs for brackish groundwater recovery projects are considerably higher than those for simple groundwater extraction and disinfection projects due to the additional treatment requirements and the cost of concentrate (brine) disposal. However, where economical options exist for disposal of brine, this type of groundwater project has proven to be an economically sound water-supply option.

5.3.1.3 Groundwater Recharge and Recovery Projects

Artificial recharge and recovery projects, also referred to as conjunctive-use projects, can increase groundwater basin yields by supplementing the natural recharge process. Conjunctive-use projects divert excess surface water supplies to percolation basins or injection wells to supplement natural rainfall runoff recharge. Captured rainfall runoff, reclaimed water, imported water, or a combination thereof, can be used to recharge groundwater basins when water levels have been lowered sufficiently by pumping. Groundwater basins can be operated similar to surface water reservoirs to supply stored water to the region if imported deliveries are limited due to high demand, or supply

and facility constraints, or a combination thereof. The Fallbrook PUD and MCB Camp Pendleton, and Padre Dam MWD and Helix WD are currently exploring the feasibility of such projects.

5.3.2 Issues

Local water agencies oftentimes need to consider a multitude of issues during the planning, permitting, design, construction, and operation of a groundwater project. The issues can include dealing with hydrogeologic uncertainties, high upfront study and subsurface investigation costs, higher unit costs association with brackish groundwater recovery and treatment, project funding considerations, water rights, regulatory and environmental concerns, and possible contamination of groundwater that might occur after the project is constructed and facilities are brought online. These issues can discourage decision makers and potentially limit the amount of groundwater development in San Diego County.

The Water Authority financial assistance program, Local Investigation and Studies Assistance Program (LISA), provides funding opportunities for facility planning, feasibility investigations, preliminary engineering studies, environmental impact reports (EIRs), and research projects related to groundwater development, which will help agencies overcome some of the risks and constraints to project development.

5.3.2.1 Hydrogeologic and Environmental Impact Uncertainty

In groundwater basins that have not been recently utilized as a source of a municipal water supply by an agency and where there is a general lack of information regarding the physical nature of the aquifer materials, existing wells and groundwater production, water quality, potential impact of pumping to riparian habitat, etc. significant resources must be expended prior to determining the feasibility of a project. Subsurface exploration and field investigations are both costly and time consuming. In addition, data management and utilization generally requires the development of costly large-scale numerical models. These issues, in conjunction with financial considerations, can oftentimes dictate that groundwater projects be developed and production increased incrementally in a planned and managed fashion.

5.3.2.2 Economic and Financial Considerations

Because of the saline nature of the water and the presence of other contaminates in many of the groundwater basins in San Diego County, the cost of groundwater development will oftentimes require demineralization and brine disposal facilities, which can be costly to construct and operate.

5.3.2.3 Institutional, Legal, and Regulatory Issues

Institutional and legal issues can also impact project development. Because groundwater basins oftentimes involve multiple water agencies and/or numerous private wells and water-right holders, water rights and management authority can be issues that need to be addressed before a project progresses beyond the planning stage. However, agencies are often reluctant to initiate groundwater development projects and go beyond the feasibility study stage unless jurisdiction and water rights issues are resolved beforehand.

Uncertainty over future regulatory requirements for drinking water supplies can pose an additional barrier to project development. When developing facilities and compliance plans for groundwater development and/or groundwater recharge projects, agencies must take into account proposed or

potential regulatory changes related to water quality issues. Some of the regulations for which changes are expected over the next decade include state and federal drinking water standards and California Department of Health Services groundwater recharge regulations.

5.3.2.4 Environmental Regulatory Constraints

Issues related to the environmental impacts that could potentially result from the fluctuation of groundwater levels when large quantities of groundwater are extracted are common to many of the groundwater projects proposed within the principal alluvial aquifers in the Water Authority's service area. These issues include potential impacts on endangered species habitat and groundwater-dependent vegetation. Impacts may occur if a project results in seasonal or long-term increases in the depth of the groundwater. Although potential environmental impacts can generally be mitigated, mitigation costs can reduce the cost-effectiveness of a project.

5.3.2.5 Water Quality

See Section 7.4, "Groundwater," for additional information on water quality for groundwater supplies.

5.3.2.6 Funding

In November 2006, the Water Authority's Local Water Supply Development Program was modified to provide up to $200 per acre-foot for potable water produced from brackish or otherwise contaminated groundwater. Currently no agencies have qualified for LWSD funding for groundwater projects. However, two local agencies, Sweetwater Authority and the city of Oceanside have received financial incentives from Metropolitan Water District's Groundwater Recovery Program (GRP) totaling $944,779 in fiscal year 2009 and $312,767 in fiscal year 2010.

5.3.3 Projected Groundwater Supply Yield

The Water Authority has worked closely with its member agencies to develop groundwater yield projections. The most reliable projections have been developed by considering only existing (verifiable) groundwater projects, which include planned expansions to existing projects.

Table 5-3 shows the projected annual yield from verifiable groundwater projects in five-year increments, based on projections and implementation schedules or existing projects and planned expansions provided by the member agencies. These are included in the reliability analysis found in Section 9, "Water Supply Reliability." Table F-2, Appendix F contains a list of the projects and the projected supplies.

Table 5-3. Projected Groundwater Supply (Normal Year – AF/YR)

2010	2015	2020	2025	2030	2035
20,833	22,030	26,620	27,620	28,360	28,360

An overall projected increase in groundwater production from 2015 and beyond is due primarily from the expansion of the brackish groundwater recovery and treatment project currently operated by the Sweetwater Authority.

The Sweetwater Authority has completed feasibility studies and design of the expansion of its Richard A. Reynolds Facility, and is currently seeking funding for construction. The agency is also participating in studies with the United States Geological Survey (USGS) to evaluate and further develop production from the San Diego Formation aquifer. Sweetwater has completed the environmental process for the expansion project; however, the city of San Diego has filed a CEQA challenge on the EIR and the outcome of that lawsuit is still pending.

The city of Oceanside has recently completed an expansion of the capacity of its Mission Basin Desalter (6.37 MGD / 4.0 MGD expansion). However, production will remain below the capacity of the facility until new conveyance and pumping facilities, required to distribute the additional supply to additional service areas, are completed. The expected completion date for the new conveyance and pumping facilities is January 2013. The ultimate production capacity, or "safe yield" of the Mission Basin will need to be verified by continued monitoring of water levels after production capacity of the current facility is realized.

5.3.3.1 Additional Planned Projects – Groundwater

Maximizing groundwater development is critical to diversifying the region's water supply portfolio. Beyond the projections of the more reliable and verifiable projects included in Table 5-3, member agencies have also identified four additional planned projects, with an estimated total of 12,700 AF/YR of additional yield in 2035. Carlsbad MWD will utilize its groundwater rights in the Mission Basin and in the Aqua Hedionda Hydrologic Area of the Carlsbad Hydrologic Unit. Carlsbad MWD's Mission Basin/Agua Hedionda Projects are expected to yield 1,000 AF/YR by 2020, ramping up to 2,000 AF/YR by 2030. The Otay WD Rancho del Rey Well Development Project is expected to yield 500 AF/YR by 2015. The Helix Water District/Padre Dam MWD's El Monte Valley Recharge Project is projected to yield 5,000 AF/YR by the year 2020, and Fallbrook PUD/MCB Camp Pendleton's Santa Margarita Conjunctive-Use Project is projected to yield an additional 5,200 AF/YR by 2020 (for a total yield from the basin of 10,800 AF/YR.) These additional yields are considered additional planned supplies and are utilized in Section 10, "Scenario Planning – Managing an Uncertain Future," as potential strategies to manage future uncertainty planning scenarios. These additional planned projects, as well as the conceptual projects provided by the member agencies, are also included in Table F-2, **Appendix F**.

5.4 Water Recycling

Another of the elements identified in the Water Authority's resource mix is the optimization of recycled water use. Every gallon of recycled water used within the region reduces the need to import or develop other water supplies. This section provides a general description of recycled water development within the Water Authority's service area, the issues associated with developing this supply, and projected regional yield. Documentation on specific existing and future recycling projects is expected to be in the 2010 plans for those agencies that include water recycling as a supply. The Water Authority coordinated the preparation of this section with its member agencies and those wastewater agencies that operate water recycling facilities within the Water Authority's service area.

5.4.1 Description

Water may be recycled for non-potable or indirect potable purposes. Non-potable recycling is the treatment and disinfection of municipal wastewater to provide a water supply suitable for non-drinking uses. Agencies in San Diego County use recycled water to fill lakes, ponds, and ornamental fountains; to irrigate parks, campgrounds, golf courses, freeway medians, community greenbelts, school athletic fields, food crops, and nursery stock; and to control dust at construction sites. Recycled water can also be used in certain industrial processes, in cooling towers and for flushing toilets and urinals in non-residential buildings. Recycled water is also being considered for street sweeping purposes.

Indirect potable reuse includes the use of multi-barrier treatment, which may include treatment technologies such as reverse osmosis and advanced oxidation, and a natural barrier, such as a groundwater basin or surface water reservoir, to render wastewater suitable for potable purposes. Several Water Authority member agencies are completing studies pertaining to potable reuse in San Diego County through groundwater recharge or reservoir augmentation.

5.4.2 Issues

Local agencies must consider a number of issues when developing recycled water projects, including economic and financial considerations; regulatory, institutional, and public acceptance issues; and water quality concerns related to unknown or perceived health and environmental risks. These issues, if unresolved, can limit the amount of recycled water use in San Diego County. The following sections discuss some of the specific challenges associated with recycled water development.

5.4.2.1 Economic and Financial Considerations

The capital-intensive cost of constructing recycled water projects and managing a dual distribution system has traditionally been a barrier to project implementation. The up-front capital costs for construction of treatment facilities and recycled water distribution systems can be high, while full market implementation is usually phased in over a number of years, resulting in very high initial unit costs that affect cash flow in the early project years.

Costs associated with converting existing water customers to non-potable recycled water use have also proved challenging. This situation is compounded by the seasonal nature of recycled water demands, a lack of seasonal storage and the lack of large industrial water users in San Diego County that can use recycled water. Projects that serve a large portion of irrigation demands, like the majority of the projects in the Water Authority's service area, often use only half of their annual production capacity due to these seasonal demand patterns. The unit costs associated with these projects tend to be higher than those of projects that serve year-round demands, since the project facilities must be sized to accommodate seasonal peaking. Projects that serve mostly irrigation demands also tend to have less stable revenue bases because irrigation demands are heavily influenced by hydrologic conditions.

Recycled water for indirect potable reuse can be stored in local reservoirs and groundwater basins. This can ensure a continuous demand and production of recycled water throughout the year making the projects more cost effective. Although indirect potable projects require a higher level of treatment that non-potable projects, these costs are offset because they do not require a dual distribution system or customer retrofits. To be economically feasible, a project's benefits must

offset or exceed its associated costs. Project benefits can take the form of: (1) revenues from the sale of recycled water; (2) increased supply reliability; (3) increased control over the cost of future water supplies; and (4) avoided water and wastewater treatment, storage, and conveyance costs. Agencies developing recycled water projects must be able to quantify these benefits in order to determine the economic feasibility of a project. In addition, financial incentives and grant funding from the Water Authority, Metropolitan, and federal and state agencies are critical to offsetting project costs and project implementation.

5.4.2.2 Regulatory

Two state agencies have primary responsibility for regulating the application and use of recycled water: the California Department of Public Health (DPH) and the California Regional Water Quality Control Board (Regional Board). Planning and implementing water recycling projects entails numerous interactions with these regulatory agencies prior to project approval.

The DPH establishes the statewide criteria for recycled water uses in Title 22 of the California Administrative Code. Under Title 22, the standards are established for each general type of use based on the potential for human contact with recycled water. The highest degree of standards for recycled water is for unrestricted body contact.

The Regional Board is charged with issuing permits and enforcing requirements for the application and use of recycled water for each recycled operation which ensures compliance with basin plan objectives and incorporates recommendations from the DPH. As part of the permit application process, applicants must demonstrate that the proposed recycled water operation will meet the ground and surface water quality objectives in the basin management plan, and will comply with Title 22 requirements. With the consent of the recycled water supplier, the Regional Board and DPH may delegate review of individual non-potable use sites to the County of San Diego Department of Environmental Health.

Coordination between the regulatory agencies responsible for monitoring development of recycled water is important, along with the development of a reasonable and consistent application of regulations. Regulatory agencies need to work more closely and cooperatively with project proponents in their efforts to satisfy the regulations and still be able to develop a much needed, cost-effective water-recycling project.

A recent regulatory development that may help expand recycled water use was the January 2011 amendments to the building standards contained in the California Code of Regulations (CCR), Title 24, Part 5, pertaining to dual plumbing design standards for use of recycled water systems inside buildings. The recent amendments established statewide standards for installing both potable and recycled water plumbing systems in commercial, retail, and office buildings; and in theaters, auditoriums, condominiums, schools, hotels, apartments, barracks, dormitories, jails, prisons, and reformatories.

Potable reuse projects require a high level of regulatory scrutiny and are currently approved on a case by case basis. Typically an expert panel is convened to look the project specifics and provide recommendations to the project proponent and DPH. While all projects will build on the knowledge and efforts obtain through past indirect potable reuse projects, local reservoir augmentation projects will be the first to be approved in the State. In 2010, the California Legislature passed AB 918 which will requires the DPH to adopt regulations for groundwater recharge and reservoir

augmentation and investigate the possibility of direct potable reuse. This will pave the way for future potable reuse projects throughout the State.

5.4.2.3 Institutional

The primary institutional issue related to the development of water recycling in San Diego County is interagency coordination, such as when the wastewater agency that produces the recycled water is not the water purveyor within the reuse area. At those times, effective communication and cooperation between both agencies regarding the distribution of recycled water and providing service to the water customer is vital and should begin early in the planning process.

These institutional arrangements require contracts and/or agreements between the parties and/or agencies involved, the terms of which must be established on a case-by-case basis. The agreements usually define the reporting and compliance responsibilities, the amount of recycled water deliveries, water pricing, and a financing plan that identifies which agency will receive the financial incentives.

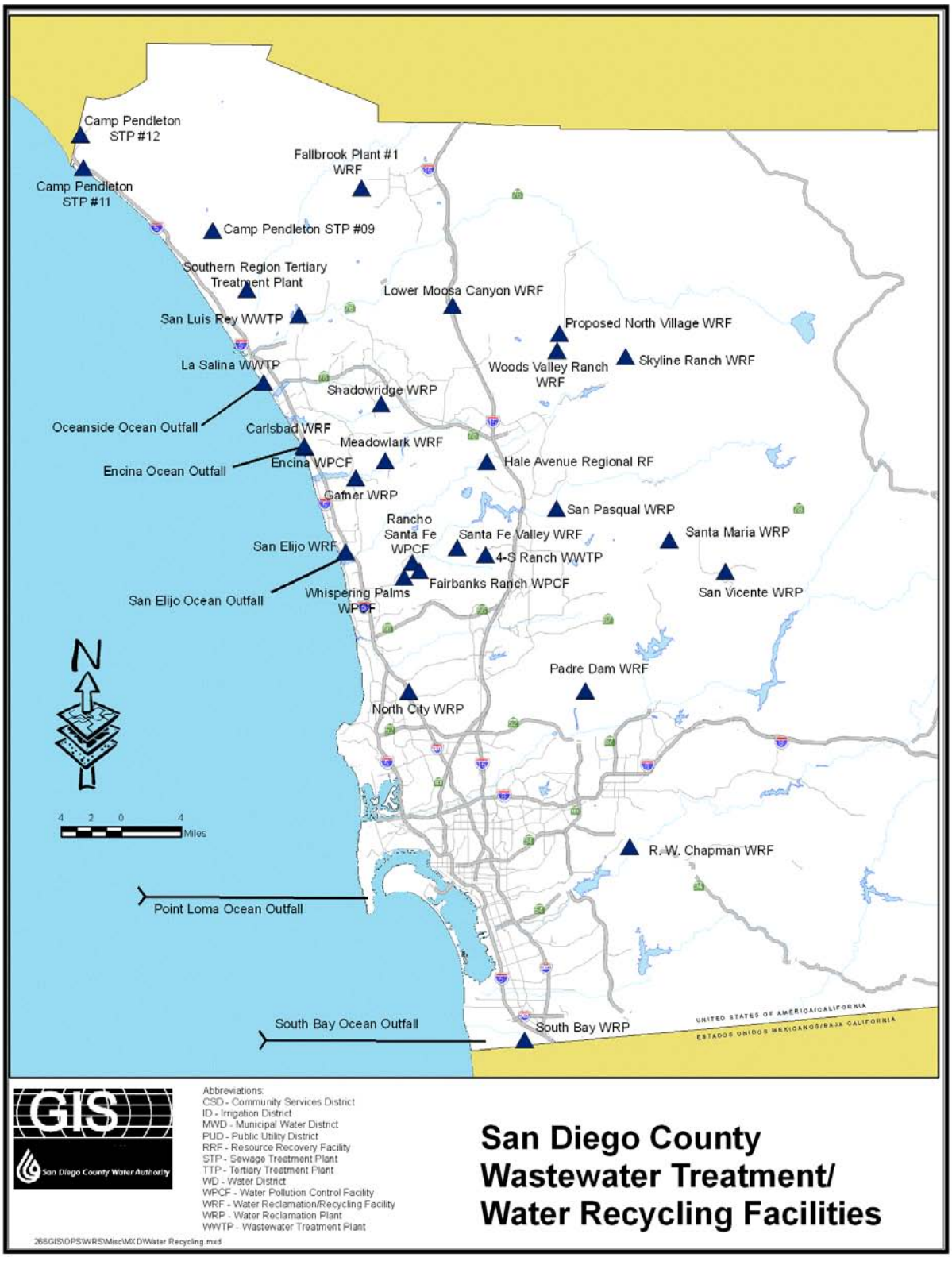
5.4.2.4 Public Acceptance

Without public acceptance, siting, financing, constructing, and operating a water-recycling project becomes increasingly difficult. For many in the public, there is a general sense of water quality and safety concerns due to a lack of understanding the water reclamation treatment process. The most successful means to obtaining public acceptance is through education and involvement. Agencies in the San Diego region have formed citizen's advisory groups and held public workshops in an effort to increase public involvement in projects, which is described in greater detail in Section 5.4.4 below. While the public has fully accepted the safety of recycled water for non-potable uses, potable reuse has had to overcome greater public acceptance hurdles. Recent impacts from drought, increased statewide experience demonstrating the safety of potable reuse projects and local support from the environmental and business communities are increasing the local public acceotance for potable reuse.

5.4.3 Wastewater Generation, Collection, Treatment, and Disposal

Approximately 300 MGD of wastewater is currently being generated, collected, treated, and disposed of within the Water Authority's service area and provides significant potential for recycled water use. Most of the large wastewater treatment plants are located along the coast for easy and convenient access to an ocean outfall. These plants serve most of the San Diego region's highly urbanized areas. Figure 5-3 identifies the location of the wastewater treatment plants and the associated outfall systems. The coastal location of the plants is not always conducive to development of recycled water. Most of the market for recycled water is located at higher elevations, making distribution systems costly. However recycled water costs could be offset by possible savings on wastewater treatment costs where those savings are available. Table F-3, **Appendix F** shows a detailed list of the wastewater treatment plants within the county, their capacities at various levels of treatment, and the type of disposal. In addition, approximately 10 to 15 MGD of wastewater within the Water Authority's service area is generated and disposed of through private systems, such as septic tanks.

Figure 5-3
Wastewater Treatment and Water Recycling Facilities



5.4.4 Encouraging Recycled Water Development

The Act requires agencies to describe in their plan the actions, including financial incentives, that agencies may take to encourage the use of recycled water. Table 5-4 summarizes the programs used by the Water Authority's member agencies. The water recycling agencies develop some of the programs, while others are developed or funded by the water providers, such as the Water Authority, Metropolitan, and state and federal agencies.

Table 5-4. Programs to Encourage Recycled Water Use

Incentive Programs
Local Water Supply Development (Water Authority)
Local Resources Program (Metropolitan)
Local Investigations and Studies Assistance Program (Water Authority)
Public Sector Water Efficiency Partnership Demonstration Program – Immediate Hookup for Potential Recycled Water Use Customers (Metropolitan)
Grants
Title XVI Funding Program (US Bureau of Reclamation)
Proposition 13 Planning Grants and Loans (State of California)
Proposition 50 Grant (State of California)
Low Interest Loans
Clean Water State Revolving Fund Program (State of California)
Long-Term Contracts to Ensure Price and Reliability
Funding Assistance to State Water Resources Control Board to fund staff position(s) to expedite water recycling projects (Water Authority**)**
Recycled Water Rate Discounts
(most San Diego area water/wastewater agencies)
Public Education/Information Materials
Market Development and Technical Assistance Program (Water Authority and most San Diego area water/wastewater agencies)
Regional Planning and Regulatory Assistance
Regional coordination with member agencies and regulatory agencies such as DPH and the San Diego Regional Board on recycled water issues
Review and comment on statewide regulatory developments and legislation to support local projects
Preparation of guidelines in conjunction with member agencies, such as Decorative Water Feature Design Guide, Dual Plumbing Standard Guidelines, etc.
Administration of Recycled Water Site Supervisor Training Workshops
(Water Authority in conjunction with member agencies)

5.4.4.1 Funding Programs

Another important component of a successful recycling project is securing diversified funding and establishing funding partnerships. The Water Authority has focused on providing and facilitating the acquisition of outside funding for water recycling projects.

Financial assistance programs available to San Diego County agencies include: the Water Authority's Local Water Supply Development Program, Metropolitan's Local Resources Program (LRP), the U.S. Bureau of Reclamation (USBR) Title XVI Grant Program, the State Water Resources Control Board (SWRCB) low-interest loan programs and the Integrated Regional Water Management Plan Grant Program. Together, these programs can offer funding assistance for all project phases, from initial planning and design to construction and operation. Financial assistance programs administered by the Water Authority, Metropolitan, and the USBR provided $9,508,617 to San Diego County agencies during fiscal year 2010.

Local Water Supply Development Program

The Water Authority administers the Local Water Supply Development (LWSD) Program (formerly referred to as the Recycled Water Development Fund (RWDF) Program initially adopted by the Board in April 1991), which is designed to ensure the financial feasibility of local water recycling projects during their initial years of operation. In November 2006, the LWSD Program was modified to provide up to $200 per acre-foot of recycled water and potable water produced from brackish or otherwise contaminated groundwater. In February 2008, the LWSD Program was again amended to expand eligibility to include seawater desalination projects and adopt updated program guidelines and funding principles.

To date, the Water Authority has entered into LWSD agreements with 11 water and wastewater agencies for a combined project yield of over 30,000 AF/YR. Over $22 million in Water Authority incentive funding has been awarded to program participants. In fiscal year 2010, the Water Authority provided local agencies with $3,575,093 in LWSD incentives.

Local Resources Program

Metropolitan also has a program that currently subsidizes the cost of water supply production from local projects during the initial years of operation. The Local Resources Program (LRP) provides subsidies of up to $250 AF/YR for recycled water and groundwater recovery projects. Currently, 14 water and wastewater agencies in San Diego County have agreements for Metropolitan LRP and Local Projects Program (LPP) funding. Metropolitan provided $4,169,089 in fiscal year 2009 and $3,620,756 in fiscal year 2010 from these funding sources.

In June 2010, the Water Authority filed suit against Metropolitan challenging its practice of allocating supply related expenses to the transportation rate it charges the Water Authority to wheel the Water Authority's independently obtained supplies. Following the filing of the lawsuit, Metropolitan sent a Notice of Intent to Cancel six Local Resources Program subsidy agreements that are subject to Metropolitan's 'Rate Structure Integrity' provision.

The Reclamation Wastewater and Groundwater Study and Facilities Act – Title XVI

The Title XVI Grant Program is a significant source of funding for San Diego area water recycling projects. Title XVI of Public Law (PL) 102-575, the Reclamation Wastewater and Groundwater Study

and Facilities Act, authorizes the federal government to fund up to 25 percent of the capital cost of authorized recycling projects, including the San Diego Area Water Reclamation Program, an inter-connected system of recycling projects serving the Metropolitan Sewage System service area. PL 104-266, the Reclamation Recycling and Water Conservation Act of 1996, authorized two additional projects in northern San Diego County: the North San Diego County Area Water Recycling Project and the Mission Basin Brackish Groundwater Desalting Demonstration Project. The North San Diego County project is no longer eligible to receive federal funding in that it has reached its maximum federal funding limit of $20 million per project. The Mission Basin project is nearing completion, having received a total of $2,500,000 so far. To date, San Diego agencies have been authorized to receive more than $192 million under the Title XVI grant program, including more than $4,472,000 obligated during federal fiscal year 2009. A total of $117,992,000 has been received from this funding source to date. Future authorizations and annual funding from this program are important, but could become more challenging due to current Federal budget challenges.

Clean Water State Revolving Fund/Water Recycling Grants

The SWRCB, through the Division of Financial Assistance, offers low interest financing agreements for water quality projects and water reclamation facilities. Annually, the program disburses between $200 and $300 million to eligible projects. The Clean Water State Revolving Fund (CWSRF) offers agencies a below-market interest rate that can result in substantial savings on debt service. Approximately $83 million was appropriated to the SWRCB in fiscal year 2009 for funding water recycling projects. An example of funding awarded to one of the Water Authority's member agencies was a $496,161 grant commitment to the city of San Diego for their South Bay Water Reclamation Plant. Additional funding can also be obtained through Water Recycling Grants to provide up to 25% of eligible construction costs with a maximum $5 million cap per agency. Planning grants of up to $75,000 maximum are also provided for eligible facilities planning/feasibility study costs.

Further, the Water Authority completed a Membrane Bioreactor (MBR) Study which evaluated 11 potential sites for MBR placement and coordinated the final Regional Recycled Water Study – Phase II Project Report to the SWRCB which included $701,262 in grant funding for 11 local member agency projects. In addition, matching funds were obtained from USBR for the Regional Recycled Water Study, and for an Otay Water District Groundwater Feasibility Study in the amount of $126,518.

Integrated Regional Water Management Plan Grant Funding, Propositions 50 and 84

In June 2008, the California DWR awarded a grant package for $25 million that will provide funding for 19 local projects designed to improve the San Diego region's water supply reliability, water quality, and natural resources. The San Diego-area projects are part of the 2007 San Diego Integrated Regional Water Management (IRWM) Plan, which aims to coordinate local water planning activities. The San Diego package was among a number of similar efforts state-wide that have been funded by the state under Proposition 50, a water bond measure approved by voters in 2002. An additional 70 million dollars has been dedicated to the San Diego IRWMP Region through Proposition 84. A portion of the funding will support recycled water projects, including for example, a recycled retrofit program, construction of treatment facilities at the San Elijo JPA and a north county recycled water study. Refer to Section 8, "Integrated Regional Water Management Planning," for more information.

5.4.4.2 Policies, Ordinances, and Guidance Documents

The Water Authority has adopted a number of policies, guidance documents, and a model ordinance to assist local agencies with water recycling project implementation. Many local agencies have adopted the Water Authority–sponsored ordinance, which includes provisions that typically require new development projects to install recycled water systems. The ordinance also states that where allowed by law and available in sufficient quantities, at a reasonable cost and quality, recycled water shall be the sole water supply delivered for non-potable uses.

In 2009, a guidance document was also developed by the Water Authority to provide general, regulatory guidelines for agencies and customers seeking to use recycled water in water features and fountains. The guidelines were approved by the local regulatory agencies.

5.4.4.3 Training

The Water Authority, in partnership with other water agencies, offers a half-day course designed to provide irrigation supervisors with a basic understanding of recycled water. Completion of the Recycled Water Site Supervisor Training fulfills the training requirement as mandated by regulatory authorities. The four-hour workshop provides information to designated Site Supervisors on: recycled water treatment and rules and regulations, backflow prevention and cross-connection shut-down testing and inspections, landscape irrigation fundamentals, and Site Supervisor responsibilities. At this time, more than 2,300 participants have been certified. Instructors include a certified cross-connection control specialist, a landscape/irrigation specialist, and a recycled water specialist.

5.4.4.4 Optimizing the Use of Recycled Water – Regional Perspective

In the Water Authority's service area, the Market Development and Technical Assistance Program was developed and implemented to promote the increased use of recycled water. Through this program, technical assistance and specific process recommendations through customer site inspections and site review reports were provided to local CII customers interested in connecting to local recycled water systems. The resources available to these CII customers included the use of technical experts in the fields of cooling tower operation, landscape irrigation, agronomy, cross control connection, and other related fields. For example, one biotech firm that requested a Customer Site Inspection could potentially realize a 46 AF/YR reduction in imported water demand by converting their cooling towers at a single facility.

Technical reference materials associated with the promotion of recycled water to CII and agricultural customers included the development of Information Data Sheets for the use of recycled water in cooling towers, detailed case studies, a Recycled Water Landscape Guide, and a Recycled Water Quality Template.

Through the Market Development and Technical Assistance Program, three specialty Industry Workshops were also scheduled and conducted. One was geared towards CII/bio-tech customers (focusing on cooling tower use), another was tailored for the Golf Course Superintendents Association, and another targeted landscape architects and contractors. Although local agencies take responsibility to expand and develop their respective recycled water projects the Water Authority provides regional leadership and assistance that will facilitate and expedite project completion and implementation. In support of the SWRCB call for salinity planning, the Water Authority, in cooperation with the Southern California Salinity Coalition (SCSC), hosted and coordinated a series

of stakeholder workshops and workgroup meetings to work in partnership with San Diego Regional Board staff to develop guidelines for the development of Salinity/Nutrient Management Plans. The final guidelines were approved supported by the San Diego Regional Board through a resolution adopted in November 2010. IRWMP Grant funding is being used to support the development of the plans.

To help advance Indirect Potable Reuse in the San Diego region, Water Authority staff participated in numerous stakeholder outreach and technical committees, including initially serving as a representative on both of the City of San Diego's American Assembly Workshops which resulted in the "unanimous agreement that current technology and scientific studies support the safe implementation of non-potable and indirect potable use projects." More recently, technical assistance has been provided to the city of San Diego for their efforts to approve and fund a demonstration-scale Advanced Water Purification (AWP) Facility at the North City Water Reclamation Plant for the Indirect Potable Reuse/Reservoir Augmentation Demonstration Project and to the Helix Water District and Padre Dam MWD joint El Monte Valley Groundwater Recharge and River Restoration Project. The Water Authority will continue to advocate at a State and local level for reasonable regulations that will support the safe use of recycled water for indirect potable reuse projects.

5.4.5 Projected Recycled Water Use

The Water Authority worked closely with its member agencies to determine the projected yield from existing and planned recycled water projects. Table 5-5 shows the estimated annual yield from the projects in five-year increments based on the implementation schedules provided by the member agencies and the likelihood of development. These projected supply yields will be included in the reliability analysis found in Section 9, "Water Supply Reliability." Table F-4, **Appendix F** contains a detailed list of the projects and projected supplies.

Table 5-5. Projected Recycled Water Use (Normal Year – AF/YR)

2010	2015	2020	2025	2030	2035
27,931	38,660	43,728	46,603	48,278	49,998

The Water Authority's 2005 Plan projected a recycled water yield of 33,688 AF/YR in the year 2010. As shown in Table 5-5 above, the actual yield for 2010 was 27,931 AF/YR. The increase in projected recycled water use shown in Table 5-5 in 2015 and beyond is primarily from the expansion of existing facilities. The Olivenhain MWD will be expanding its use of recycled water from its connection with the city of San Diego's North City Water Reclamation Plant to 800 AF/YR of recycled water for customers within Olivenhain's Southeast Quadrant, which encompasses 4S Ranch, Santa Fe Valley, and the Rancho Santa Fe/Fairbanks Ranch area. Olivenhain MWD's connection from the Vallecitos Water District's Meadowlark Water Recycling Facility will ultimately provide approximately 1,000 AF/YR of recycled water to Olivenhain MWD customers.

A marked increase in the use of recycled water also stems from MCB Camp Pendleton's expanded production and use of recycled water. Through the South and North Wastewater Treatment Plants and other production plants, over 4,000 AF/YR of recycled water will be beneficially used throughout the military base by 2015.

5.4.5.1 Additional Planned Projects – Recycled Water

Maximizing recycled water development is critical to diversifying the region's water supply portfolio. Beyond the verifiable project yields included in Table 5-5 above, member agencies have also identified additional planned projects. Carlsbad MWD, Fallbrook PUD, Olivenhain MWD, Padre Dam MWD, City of Poway, City of San Diego, Santa Fe ID, and Valley Center MWD all have identified additional planned projects which are projected to yield an additional 26,383 AF/YR by 2030. These yields are considered additional planned supplies and are utilized in **Section 10**, "Scenario Planning – Managing an Uncertain Future." These additional planned projects, as well as the conceptual projects provided by the member agencies, are also included in Table F-4, **Appendix F**.

As part of the City of San Diego's effort to provide a local and sustainable water supply, the City's Water Purification Demonstration Project (WPDP) is examining the use of advanced water purification technology to provide safe and reliable water for San Diego's future, and will determine if reservoir augmentation using this purified water is a feasible option for San Diego. The WPDP is underway and will conclude in 2012. During this time, the advanced water purification facility (AWPF) will operate for approximately one year and will produce 1 MGD of purified water. A study of the San Vicente Reservoir is being conducted to test the key functions of reservoir augmentation and to determine the viability of a full-scale project. During the demonstration phase, no purified water will be sent to the reservoir. Instead the purified water will supply water to the non-potable recycled water distribution system. A summary report detailing the results of the WPDP will be provided to the Mayor and San Diego City Council. If deemed technically and economically feasible, and after City Council and Mayoral approval, a full-scale AWPF could produce approximately 15,000 AF/YR of high quality advanced treated recycled water. Helix Water District and Padre Dam MWD are completing planning of the El Monte Valley Recharge Project (indirect potable reuse through groundwater recharge) which is expected to provide 5,000 AF/YR of supply. The project is currently undergoing environmental review and design is expected to be completed by late 2012. The City of Escondido is both planning to expand its non potable water recycling program to include additional landscaping and potentially agricultural irrigation as well as incorporate a future indirect potable reuse element. Escondido is pursuing this dual path for water supply reliability and to avoid the cost of a future ocean outfall expansion associated with its discharge of secondary treated wastewater. At this point the Escondido City council has approved exploring this alternative and has incorporated this approach into their long range financial planning. As part of its plans to further expand its recycled water program, the Rincon Municipal Water District is beginning to study options for potable reuse through groundwater recharge in less urbanized portions of their service area.

5.5 Member Agency Seawater Desalination

5.5.1 Rosarito Beach Desalination Project, Otay Water District

The Otay Rosarito Beach Desalination Project is not considered a verifiable supply, and is therefore not included in the reliability assessment in Section 9. The Otay project is considered an additional planned project and is utilized in Section 10 as a potential strategy to manage future uncertainty planning scenarios.

A private developer, NSC Agua, is in the process of obtaining a contract to build a 50-MGD desalination plant next to the existing power plant in Rosarito Beach, Mexico. NSC Agua would

permit, design, construct and operate the Rosarito Beach Desalination Facility. Otay Water District (Otay) would purchase excess product water of up to 20,200 AF/YR by 2015, ramping up to 38,600 AF/YR by 2035. In order to convey the purchased product water from the Rosarito plant into its service area, Otay is currently evaluating conveyance and treatment options. Otay's conveyance and treatment project, within the U.S., would have to undergo an environmental review and permitting process once a final project description has been determined. Otay is projecting this private development project could be operational as early as 2015.